

WEST Search History

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DATE: Thursday, September 09, 2004

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		<i>DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ</i>	
<input type="checkbox"/>	L11	134/\$.ccls. and l9	36
<input type="checkbox"/>	L10	L9 and ((liquid jet) or column)	6
<input type="checkbox"/>	L9	L8 and ((boundary layer) or (liquid layer))	84
<input type="checkbox"/>	L8	L7 and ozone	412
<input type="checkbox"/>	L7	workpiece and cleaning	12295
<input type="checkbox"/>	L6	l2 and (jet or column) and (heated liquid)	2
<input type="checkbox"/>	L5	L4 and jet	2
<input type="checkbox"/>	L4	L3 and ozone	2
<input type="checkbox"/>	L3	L2 and (liquid layer)	5
<input type="checkbox"/>	L2	L1 and cleaning	90
<input type="checkbox"/>	L1	flat media	500

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20020157686 A1

Using default format because multiple data bases are involved.

L6: Entry 1 of 2

File: PGPB

Oct 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020157686

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020157686 A1

TITLE: Process and apparatus for treating a workpiece such as a semiconductor wafer

PUBLICATION-DATE: October 31, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kenny, Michael	Kalispell	MT	US	
Aegeter, Brian	Kalispell	MT	US	
Bergman, Eric	Kalispell	MT	US	
Scranton, Dana	Kalispell	MT	US	

US-CL-CURRENT: 134/1.3; 134/153, 134/21, 134/28, 134/30, 134/33, 134/34, 134/902, 134/95.3, 257/E21.228, 257/E21.229

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 2. Document ID: US 20020066464 A1

L6: Entry 2 of 2

File: PGPB

Jun 6, 2002

PGPUB-DOCUMENT-NUMBER: 20020066464

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020066464 A1

TITLE: Processing a workpiece using ozone and sonic energy

PUBLICATION-DATE: June 6, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Bergman, Eric	Kalispell	MT	US	

US-CL-CURRENT: 134/1; 134/102.1, 134/107, 134/186, 134/28, 134/30, 134/36,

134/95.2, 134/95.3, 257/E21.228, 257/E21.229

ABSTRACT:

An apparatus for processing a semi-conductor wafer or similar workpiece has one or more liquid outlets for applying a heated process liquid to the wafer within a process chamber. Ozone gas is provided into the chamber directly, or via the processed liquid. Sonic energy is introduced to the workpiece through a layer of liquid. In an alternative design, the wafers are immersed in heated process liquid, and an ozone atmosphere is provided above the liquid. The wafers are then lifted out of the liquid, or the liquid is alternatively drained off. The ozone gas/liquid interface passes down across the surfaces of the wafers.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Term	Documents
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JETS	102386
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COLUMNS	330549
HEATED	1643478
HEATEDS	3
LIQUID	2685872
LIQ	359896
LIQS	12873
LIQUIDS	385821
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(L2 AND (JET OR COLUMN) AND (HEATED LIQUID)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	2

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Search Results - Record(s) 1 through 6 of 6 returned.

☐ 1. Document ID: US 20030196678 A9

Using default format because multiple data bases are involved.

L10: Entry 1 of 6

File: PGPB

Oct 23, 2003

PGPUB-DOCUMENT-NUMBER: 20030196678
PGPUB-FILING-TYPE: corrected
DOCUMENT-IDENTIFIER: US 20030196678 A9

TITLE: DELIVERY OF DISSOLVED OZONE

PUBLICATION-DATE: October 23, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Torek, Kevin J.	Meridian	ID	US	
Morgan, Jonathan C.	Nampa	ID	US	
Morgan, Paul A.	Kuna	ID	US	

US-CL-CURRENT: 134/1; 257/E21.255

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Data
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☐ 2. Document ID: US 20020157686 A1

L10: Entry 2 of 6

File: PGPB

Oct 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020157686
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020157686 A1

TITLE: Process and apparatus for treating a workpiece such as a semiconductor wafer

PUBLICATION-DATE: October 31, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kenny, Michael	Kalispell	MT	US	
Aegeter, Brian	Kalispell	MT	US	
Bergman, Eric	Kalispell	MT	US	
Scranton, Dana	Kalispell	MT	US	

US-CL-CURRENT: 134/1.3; 134/153, 134/21, 134/28, 134/30, 134/33, 134/34, 134/902,
134/95.3, 257/E21.228, 257/E21.229

ABSTRACT:

In a system for cleaning a workpiece or wafer, a boundary layer of heated liquid is formed on the workpiece surface. Ozone is provided around the workpiece. The ozone diffuses through the boundary layer and chemically reacts with contaminants on the workpiece surface. A jet of high velocity heated liquid is directed against the workpiece, to physically dislodge or remove a contaminant from the workpiece. The jet penetrates through the boundary layer at the point of impact. The boundary layer otherwise remains largely undisturbed. Preferably, the liquid includes water, and may also include a chemical. Steam may also be jetted onto the workpiece, with the steam also physically removing contaminants, and also heating the workpiece to speed up chemical cleaning. The workpiece and the jet of liquid are moved relative to each other, so that substantially all areas of the workpiece surface facing the jet are exposed at least momentarily to the jet. Sonic or electromagnetic energy may also be introduced to the workpiece.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 3. Document ID: US 20020066464 A1

L10: Entry 3 of 6

File: PGPB

Jun 6, 2002

PGPUB-DOCUMENT-NUMBER: 20020066464

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020066464 A1

TITLE: Processing a workpiece using ozone and sonic energy

PUBLICATION-DATE: June 6, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Bergman, Eric	Kalispell	MT	US	

US-CL-CURRENT: 134/1; 134/102.1, 134/107, 134/186, 134/28, 134/30, 134/36,
134/95.2, 134/95.3, 257/E21.228, 257/E21.229

ABSTRACT:

An apparatus for processing a semi-conductor wafer or similar workpiece has one or more liquid outlets for applying a heated process liquid to the wafer within a process chamber. Ozone gas is provided into the chamber directly, or via the processed liquid. Sonic energy is introduced to the workpiece through a layer of liquid. In an alternative design, the wafers are immersed in heated process liquid, and an ozone atmosphere is provided above the liquid. The wafers are then lifted out of the liquid, or the liquid is alternatively drained off. The ozone gas/liquid interface passes down across the surfaces of the wafers.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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4. Document ID: US 20010037816 A1

L10: Entry 4 of 6

File: PGPB

Nov 8, 2001

PGPUB-DOCUMENT-NUMBER: 20010037816
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010037816 A1

TITLE: Delivery of dissolved ozone

PUBLICATION-DATE: November 8, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Torek, Kevin J.	Meridian	ID	US	
Morgan, Jonathan C.	Nampa	ID	US	
Morgan, Paul A.	Kuna	ID	US	

US-CL-CURRENT: 134/1; 257/E21.255

ABSTRACT:

An apparatus and method for delivering ozone to a workpiece. In one embodiment, fluid is sprayed onto a workpiece placed in an ozone-rich environment. Alternatively, ozone is mixed with the fluid prior to spraying the fluid onto the workpiece. When spraying the fluid, the invention pulses the fluid at desired rates to create a substantially uniform layer of ozone-rich fluid on the workpiece. In another embodiment, the workpiece is also slowly rotated during at least a portion of the time the layer of ozone-rich fluid is applied to the workpiece.

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Drawn De
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5. Document ID: US 6758938 B1

L10: Entry 5 of 6

File: USPT

Jul 6, 2004

US-PAT-NO: 6758938
DOCUMENT-IDENTIFIER: US 6758938 B1

TITLE: Delivery of dissolved ozone

DATE-ISSUED: July 6, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Torek; Kevin J.	Meridian	ID		
Morgan; Jonathan C.	Nampa	ID		
Morgan; Paul A.	Kuna	ID		

US-CL-CURRENT: 156/345.11; 156/345.18, 156/345.21, 156/345.26, 156/345.33,
156/345.34

ABSTRACT:

An apparatus and method for delivering ozone to a workpiece. In one embodiment, fluid is sprayed onto a workpiece placed in an ozone-rich environment. Alternatively, ozone is mixed with the fluid prior to spraying the fluid onto the workpiece. When spraying the fluid, the invention pulses the fluid at desired rates to create a substantially uniform layer of ozone-rich fluid on the workpiece. In another embodiment, the workpiece is also slowly rotated during at least a portion of the time the layer of ozone-rich fluid is applied to the workpiece.

31 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw De
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6. Document ID: US 6645874 B1

L10: Entry 6 of 6

File: USPT

Nov 11, 2003

US-PAT-NO: 6645874

DOCUMENT-IDENTIFIER: US 6645874 B1

TITLE: Delivery of dissolved ozone

DATE-ISSUED: November 11, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Torek; Kevin J.	Meridian	ID		
Morgan; Jonathan C.	Nampa	ID		
Morgan; Paul A.	Kuna	ID		

US-CL-CURRENT: 438/723; 134/1.3, 257/E21.255, 438/748

ABSTRACT:

An apparatus and method for delivering ozone to a workpiece. In one embodiment, fluid is sprayed onto a workpiece placed in an ozone-rich environment. Alternatively, ozone is mixed with the fluid prior to spraying the fluid onto the workpiece. When spraying the fluid, the invention pulses the fluid at desired rates to create a substantially uniform layer of ozone-rich fluid on the workpiece. In another embodiment, the workpiece is also slowly rotated during at least a portion of the time the layer of ozone-rich fluid is applied to the workpiece.

23 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 5

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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Term	Documents
LIQUID	2685872
LIQ	359896
LIQS	12873
LIQUIDS	385821
JET	416607
JETS	102386
COLUMN	884504
COLUMNS	330549
(9 AND ((LIQUID ADJ JET) OR COLUMN)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	6
(L9 AND ((LIQUID JET) OR COLUMN)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	6

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